REMARKS

Claims 1 and 3-15 remain in the application. Claims 1 and 10 are amended to emphasize distinctions over cited prior art; Claim 1 is also amended to include the limitations of Claim 2, which is canceled. Claims 5, 6, and 10 are amended to overcome rejections under 35 USC 112.

The specification is amended on pages 8, 9, and 21 to be consistent with the amendments to the claims.

The Abstract is amended to reduce the word count to 150 words, as required by the Examiner.

Attached hereto is a marked-up version of the changes made to the specification, claims, and Abstract by the current Amendment. The attached page is captioned "**Version with Markings to Show Changes Made**". The Abstract is also provided as a separate page.

Applicants' undersigned representative wishes to express his appreciation for the telephone discussion with the Examiner on June 25, 2002, at which time he sought clarification as to item 4(b), items 10/12, and items 11/13 of the Examiner's Detailed Action.

The Examiner objects to the Abstract as containing more than 150 words.

Applicants have amended the Abstract to be less than 150 words.

The Examiner objects to Claim 6 under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicants are required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Specifically, the Examiner contends that Claim 6, which depends on Claim 5, recites groups "N-vinyl carbazole, N-vinyl pyrrolidone, vinyl imidazole, vinyl pyridine, 1,4-diisocyanatobenzene, and 1,4-dicyclohexane diisocyanate". The Examiner argues that this claim fails to further limit the subject matter of Claim 5 given that these groups do not further limit any of the groups recited in Claim 5, but rather, given that these recited groups are different than those in Claim 5, broaden the scope of Claim 5.

Applicants agree, and have amended Claim 6 to depend from Claim 1.

Reconsideration of the objection to Claim 6, as amended, under 37 CFR 1.75(c) is respectfully requested.

Claims 5-6 and 10-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

(A1) With regard to Claim 5, the Examiner states that the claim recites that the "polymer is selected from the group consisting of (a) acrylic and methacrylic acids and salts thereof, (b) esters of acrylic and methacrylic acid,. . . ". The Examiner contends that the scope of the claim is confusing because it is not clear how a polymer is selected from a group of monomers and asks whether the polymers are obtained from these monomers.

Claim 5 is amended to specify that the polymers are polymerized monomers "selected from the group consisting of ...". The recited monomers are polymerized to form the polymers employed in the fixative. Claim 5 is further amended to specify that the copolymer of Claim 1 is at least two copolymerized monomers.

(A2) The Examiner raises similar questions with regard to Claim 6, which recites that the "polymer is selected from the group consisting of" and then recites several different types of monomers.

Claim 6 is amended in a similar fashion as Claim 5.

In connection with the foregoing, the specification is amended on page 8, line 19 to be more precise as to the polymers being polymerized from the listed monomers.

(B1) Also with regard to Claim 5, the Examiner states that the claim recites "(d) polyethylene glycols and esters of acrylic and methacrylic acid". The Examiner contends that the scope of the claim is confusing because it is not clear what compounds are encompassed by this phrase and asks whether this refers to copolymers of polyethylene glycol and esters of acrylic and methacrylic acid, requesting clarification.

Applicants believe that the Examiner is referring to group (e), not group (d), and have responded accordingly. This item was clarified in the above-referenced telephone discussion of June 25, 2002, and the Examiner agrees that she meant to refer to group (e). The term "polyethylene glycols and esters" is more appropriately re-written as --polyethylene glycol esters--, as one skilled in the art would know. Claim 5 has been so amended, as has the specification on page 9, line 8.

(B2) The Examiner raises similar questions in group (f), which recites the same claim language.

Group (f) of Claim 5 has been amended in a similar manner as group (e). Further, the specification on page 9, line 12 has also been so amended.

(C) The Examiner states that Claim 5 recites "(j) styrene and its derivatives". The Examiner contends that the scope of the claim is confusing because it is not clear what is meant by "its derivatives". The Examiner questions what types of compounds are encompassed by this phrase - substituted styrene or copolymers of styrene and other monomers.

Applicants have replaced "its derivatives" with --substituted styrene--. Page 12, line 10 of the specification provides a formula for styrene, and shows X and Y substituents, which are independently H, NH_2, SO_3H, OCH_3, or a radical of C_1 to C_{20}. If this language is also unacceptable to the Examiner, she is invited to suggest more appropriate language, based on Applicants' disclosure.

(D) The Examiner states that Claim 10, lines 9-10, discloses that the reactive monomer or oligomer reacts with the second component to form a polymer, while lines 4-6 of the claim recite that the reactive monomer or oligomer is isocyanate or epoxy-terminated oligomer and the second component is "selected from the group consisting of polyols, polyvinyl alcohols, and base catalysts". The Examiner contends that the scope of the claim is confusing because it is not clear what type of polymer is formed or how the polymer is formed if the reactive monomer is, for instance, isocyanate, and the second component is a base catalyst, and requests clarification.

Applicants agree. The second component is selected from the group consisting of polyols and polyvinyl alcohols. A base catalyst is included with the second component. Claim 10 has been amended to clarify this point, as has the specification on page 21, starting on line 25.

Reconsideration of the rejection of Claims 5-6 and 10-15, as amended, under 35 U.S.C. 112, second paragraph, is respectfully requested.

Claims 1-4 and 6-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Kurabayashi et al (U.S. 5,985,975) taken in view of the evidence found in Mercurio et al (U.S. 4,023,977). Claim 2 has been cancelled.

Kurabayashi et al disclose a liquid composition, ink set, and method and apparatus for forming an image. The liquid composition contains a cationic fluorocarbon surfactant and a

polymer, but no colorant. The liquid composition is used to "fix" an ink that contains either a water-soluble dye having at least one anionic group or a pigment and an anionic compound.

Mercurio et al is cited for its disclosure of glass transition temperatures.

Applicants' Claim 1, as amended, recites a fixative for ink-jet printing. The fixative is used for underprinting or overcoating, or both, with at least three color inks printed on a print medium, each ink printed from a separate print cartridge. The fixative comprises a one-part system and consists essentially of a polymer in a vehicle. The polymer is selected from the group consisting of vinyl-based polymers, condensation polymers, and copolymers thereof. The polymer has a glass transition temperature within a range of -50° to +100°C, a melting temperature within a range of 30° to 150°C, and a molecular weight (weight average basis) within a range of 3,000 to 100,000. The fixative is contained in a separate cartridge from the ink-jet ink print cartridges.

Claims 3-4 and 6-9 depend directly or indirectly from Claim 1.

The Examiner argues that Kurabayashi et al disclose a fixative for ink jet printing wherein the fixative either underprints or overcoats the ink and wherein the fixative comprises vehicle and 0.05-20% polymer which has weight average molecular weight of 2,000-10,000 such as polyvinyl pyrrolidone. The Examiner contends that this reference discloses that the ink jet printer used to print the above fixative and ink contains separate cartridges for each of the fixative and the ink and further that this reference discloses an ink set comprising cyan, yellow, magenta, and black inks as well as the fixative described above, citing Col.3, lines 23-51, Col.4, lines 6-41, Col.6, lines 16-22, 32-33, and 41-43, Col.6, line 59-Col.7, line 4, Col.7, lines 37-39, Col.11, lines 63-64, Col.14, lines 5-7, and example 1.

The Examiner admits that there is no explicit disclosure of the glass transition temperature of the polyvinyl pyrrolidone, but contends that it is well known that the glass transition temperature of polyvinyl pyrrolidone is 54°C. Evidence to support this position is, according to the Examiner, found in Mercurio et al, citing Col.4, line 10. Additionally, although there is no explicit disclosure of the melting temperature of polyvinyl pyrrolidone, given that Kurabayashi et al disclose polyvinyl pyrrolidone possessing a glass transition temperature, which defines polymer morphology, and molecular weight, which defines the polymer size or chain length, as presently claimed, it is clear, according to the Examiner, that the polyvinyl pyrrolidone would inherently possess melting temperature as presently claimed.

In contrast to the Examiner's characterization of Kurabayashi et al above, this reference discloses a two-stage reaction of fixing the colorant. In the first stage, a cationic fluorocarbon surfactant contained in the liquid composition (fixer solution) associates with either a water-soluble dye having an anionic group or an anionic compound used in a pigment ink to "instantly separate from a solution phase in the first stage of reaction" (Col. 4, lines 13-20). In the second stage, the association products of the dye and the cationic fluorocarbon surfactant or aggregates of pigment "are adsorbed by the high-molecular weight substance", also contained in the fixer (Col. 4, lines 21-27). As a consequence, the size of the association product is further increased, thereby making it difficult for the dye or pigment to penetrate between the fibers of the recording sheet.

Thus, fixing is actually performed by the cationic fluorocarbon surfactant, with the high-molecular weight substance present to further increase the size of the reaction product. There is absolutely no disclosure or suggestion that the high-molecular weight substance, by itself, could fix the dye or pigment.

On the other hand, Applicants have discovered certain classes of polymers that directly fix the dye or pigment, and do not require the presence of any other ingredients, such as cationic fluorocarbon surfactants, to fix the dye or pigment. Applicants have amended Claim 1 to specify that there is no other material ingredient present in the fixative, by specifying that the "fixative ... --consists essentially of-- a polymer in a vehicle". Substitution of --consists essentially of-- for "comprises" excludes other substances, such as cationic fluorocarbon surfactants, that would have a material effect on the fixing.

Kurabayashi et al fail to disclose or even remotely suggest the use of a polymer (or copolymer) alone as a fixative.

Reconsideration of the rejection of Claims 1, 3-4, and 6-9, as amended, under 35 U.S.C. 102(b) as being anticipated by Kurabayashi et al taken in view of the evidence found in Mercurio et al is respectfully requested.

The Examiner is correct in her presumption that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made. Applicants are aware of their obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made.

Claims 1 and 5-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kashiwazaki et al (U.S. 5,640,187) in view of Mercurio et al (U.S. 4,023,977), Satake et al (U.S. 5,814,685), Takizawa et al (US. 5,623,294), and Thompson et al (U.S. 6,341,856).

Kashiwazaki et al, cited by Applicants in an Information Disclosure Statement submitted with the patent application, disclose an ink jet recording method and apparatus therefore. The method comprises discharging an ink droplet composed of an ink composition containing a pigment, a water-soluble resin for dispersing the pigment, and water to a recording medium. The recording method further comprises discharging a solution containing particles and/or binder polymer onto the recording medium, prior to discharging the ink.

Mercurio et al is discussed above.

Satake et al disclose an ink jet recording liquid, which includes a pigment colorant, which is dispersed by an aqueous dispersion-type resin comprising a shell composed of a polymer having a glass transition temperature of 50° to 150°C and a core composed of a polymer having a glass transition point in the range of -100° to 40°C.

Takizawa et al disclose an ink-jet recording process and an ink set and recording apparatus for use in the process. The process includes applying a first liquid containing at least a water-soluble resin having at least on carboxyl group or anhydride thereof, or sulfonic group per molecule to a recording medium and then applying an ink containing water, an organic solvent, a dye, an alkali-soluble resin, and an alkali to the portions where the first liquid has adhered.

Thompson et al disclose an ink jet printing process using reactive inks. The ink contains dyes or pigments, a liquid carrier, and compounds with functional groups capable of reacting with active hydrogen, and compounds with functional groups containing active hydrogen, or functional groups capable of conversion to active hydrogen containing groups. One or more emulsifying agents emulsify the liquid ink. An image is printed onto a substrate, at a relatively low temperature, so that the ink is not activated during the process of printing onto the medium. The image is subsequently transferred or permanently fixed on the substrate by the application of heat and pressure, which activates the ink, and bonds the colorant to the substrate.

Applicants' Claims 1 and 6-9 are discussed above. Claim 5, which depends from Claim 1, recites a generic list of polymers useful in the practice of the present invention.

Applicants have amended Claim 1 to include the limitations of Claim 2, thereby obviating the rejection.

Reconsideration of the rejection of Claims 1 and 5-9, as amended, under 35 U.S.C. 103(a) as being unpatentable over Kashiwazaki et al in view of Mercurio et al, Satake et al, Takizawa et al, and Thompson et al is respectfully requested.

Claims 10 and 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kashiwazaki et al (U.S. 5,640,187) in view of Lawrence et al (U.S. 6,280,027) and Thompson et al (U.S. 6,341,856).

Kashiwazaki et al and Thompson et al are discussed above.

Lawrence et al disclose an ink jet printing process comprising (a) providing an ink jet recording element comprising a support having thereon an image-recording layer comprising a mixture of an anionic, water-dispersible polyurethane and a hydrophilic polymer; and (b) applying droplets of a liquid ink on the image-recording layer in an image-wise manner, the ink comprising water, humectant, and a water-soluble cationic or basic dye.

Applicants' independent Claim 10, as amended, recites a fixative for ink-jet printing. The fixative is used for underprinting or overcoating, or both, with at least one ink printed on a print medium, each the ink printed from a separate print cartridge. The fixative comprises a two-part system and consists essentially of (1) a reactive monomer or oligomer in a vehicle, the reactive monomer or oligomer selected from the group consisting of iso-cyanates and epoxy-terminated oligomers and (2) at least one second component selected from the group consisting of polyols and polyvinyl alcohols plus a base catalyst. The reactive monomer or oligomer is contained in a separate cartridge from the ink-jet ink print cartridge(s) and the second component contained in the ink-jet ink print cartridge(s). The reactive monomer or oligomer reacts with the second component(s) on the print medium to form a polymer, the polymer having a glass transition temperature within a range of -50°C to +100°C and a melting temperature within a range of 30°C to 150°C.

Claims 14 and 15 depend from Claim 10.

The Examiner argues that Kashiwazaki et al disclose a fixative for ink jet printing wherein the fixative underprints the ink and wherein the fixative comprises vehicle and 0.001-20% polyurethane, citing Col. 2, lines 18-27, Col. 6, lines 25-29, and Col. 7 lines 18-19 and 23-25.

The Examiner contends that the difference between Kashiwazaki et al. and the present claimed invention is the requirement in the claims of (a) two-part system, (b) glass transition temperature and melting temperature of the polymer, and (c) amount of reactive monomer.

With respect to difference (a), the Examiner notes that the present claims require a fixative comprising a reactive monomer such as isocyanate and second component such as polyol wherein the reactive monomer and second component react to form a polymer on the printing medium while Kashiwazaki et al disclose jetting a fixative comprising polyurethane onto a printing medium. It is well known that polyurethane is formed by the reaction of isocyanate and polyol.

The Examiner argues that the present claims are directed to a fixative, and further that the claimed fixative is the same as the fixative of Kashiwazaki et al once the isocyanate and polyol are reacted on the printing medium, that is, after reaction the claimed fixative comprises polyurethane, i.e., formed by the reaction of isocyanate and polyol, as does the reference fixative, it is not seen as to how the process of forming the fixative by separately combining the ingredients via a reaction between isocyanate and polyol (two-part system) would lead to the fixative as being patentable over the same fixative formed by directly jetting the polymer into the printing medium (one-part system). Moreover, there is no evidence to indicate any criticality of the two-part system over the one-part system.

It appears that the Examiner is assuming that there is only one polyurethane, when, in point of fact, there is a significant number and variety of polyurethanes. Not all polyurethanes can be jetted through the nozzles in the nozzle plate of an ink cartridge, due, for example, to particle size. On the other hand, the ability to react the isocyanate and the polyol on the print medium permits tailoring the properties of any desired polyurethane to the needs of fixing.

Applicants provide herewith a Declaration under 37 CFR 1.132, which is directed to listing the advantages of a two-part system, as claimed in Claims 10-15, as compared to the one-part system of Kashiwazaki et al. The many advantages listed include:

(a) cross-linking performed *in situ* on the print media;

(b) topographical concerns of the print media surface;

(c) solubility of the monomers (isocyanates and polyols) in the ink is much easier to achieve than with the use of preformed polymers in the ink; and

(d) variety of cross-linking monomers can be successively applied to the print sample.

Each of these advantages is discussed in the Declaration. Clearly, a two-component fixative that reacts on the print medium to provide a polymer that performs fixing is superior to a one-component fixative that comprises the polymer. In particular, the ability to tailor the monomers that are polymerized *in situ* offers a unique advantage over a jetted polymer that is not obvious from the teachings of Kashiwazaki et al.

With regard to difference (b), the references related to this difference specifically disclose glass transition temperatures or melting temperature of the polymer (Lawrence et al) and operating temperature of the ink jet inks (Thompson et al). However, Applicants submit that these references are rendered irrelevant by the proffered Rule 132 Declaration.

With respect to difference (c), the Examiner argues that Kashiwazaki et al disclose the use of polyurethane in the fixative fluid, where it is well known that polyurethane is formed by reacting isocyanate and polyol. The Examiner contends that Thompson et al, which is drawn to reactive ink compositions, disclose reacting 2-40% isocyanate with polyol, citing Col. 13, lines 23-24, wherein the amount of isocyanate controls the degree of crosslinking, citing Col. 5, lines 45-47, which in turn would control the properties of the final reacted product, i.e. polyurethane, such as viscosity, molecular weight, and solubility.

According to the Examiner, in light of the above, it therefore would have been obvious to one of ordinary skill in the art to use this amount of isocyanate when forming the polyurethane of Kashiwazaki et al, in order to produce polyurethane with the desired viscosity, molecular weight, and solubility, and thereby arrive at the claimed invention.

The Kashiwazaki et al reference, as the Examiner admits, is directed to a one-part fixative system. Thompson et al disclose ink jet printing onto a textile substrate, such as cotton, silk, or wool, where the images produced have excellent colorfastness to laundering and abrasion (Col. 4, lines 1-9). The image is printed either directly or indirectly onto the textile substrate. If the image is printed onto a paper substrate, it is only for the purposes of transferring to the textile substrate (Col. 4, lines 28-30).

Moreover, the two-component system of Thompson et al includes a blocking agent or a physical barrier (e.g., encapsulating agents), to prevent reaction between the two reactive species (Col. 4, lines 19-27). Fixation is accomplished by subsequent application of heat or

pressure (Col. 4, lines 30-35). Applicants' fixatives are devoid of such blocking agents, since their fixing reaction is intended to take place upon printing of the ink jet ink; see, the specification on page 22, lines 1-2 and Claim 10. In contrast, Thompson et al cannot have the reaction take place upon printing of the ink; see, e.g., Col. 5, line 61 to Col. 6, line 4.

Finally, Applicants' fixer and inks are solutions (or, in the case of pigment-based inks, dispersions). Neither, however, are stable emulsions or emulsion-like system, which are the basis of the two-components of Thompson et al (Col. 4, lines 15-18 and lines 46-58).

For the foregoing reasons, in combination with the Rule 132 Declaration, Applicants submit that Claims 10 and 14-15 are patentable over the combination of the cited references.

Reconsideration of the rejection of Claims 10 and 14-15, as amended, under 35 U.S.C. 103(a) as being unpatentable over Kashiwazaki et al in view of Lawrence et al and Thompson et al is respectfully requested.

Claims 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kashiwazaki et al in view of Lawrence et al and Thompson et al as applied to Claims 10 and 14-15 above, and further in view of Kurabayashi et al (U.S. 5,985,975).

The four references are discussed above.

Claims 11-13 are directed to (a) the use of three color inks in three separate print cartridges (Claim 11), (b) specifying the three colors as cyan, yellow, and magenta (Claim 12), and (c) the inclusion of black ink in a separate print cartridge (Claim 13).

The Examiner argues that the difference between Kashiwazaki et al in view of Lawrence et al and Thompson et al and the present claimed invention is the requirement in the claims of different color inks. The Examiner contends that Kashiwazaki et al disclose underprinting an ink composition with fixative. However, the Examiner admits that there is no disclosure of using the fixative with a set of different color inks as presently claimed. The Examiner notes that Kurabayashi et al disclose using fixative with a set of inks including yellow, cyan, magenta, and black inks in order to produce a multicolor image with no intercolor bleed, citing Col. 3, lines 23-25 and Col. 4, lines 3 7-39. According to the Examiner, in light of the above, it therefore would have been obvious to one of ordinary skill in the art to use fixative of Kashiwazaki et al. with the set of different color inks in order to prevent bleed between the inks, and thereby arrive at the claimed invention.

Claims 11-13 depend directly or indirectly from Claim 10, and the comments made above regarding Kashiwazaki et al, Lawrence et al, and Thompson et al obtain here as well, together with the Rule 132 Declaration.

Further, the amendment to Claim 10, changing "comprising" to --consisting essentially of--, is similar to that of Claim 1, and limits the fixative to those enumerated components, thereby excluding other substances, such as cationic fluorocarbon surfactants, that would have a material effect on the fixing. For the same reasons discussed above in connection with Claim 1, such a limitation removes Kurabayashi et al as a viable reference.

Reconsideration of the rejection of Claims 11-13 under 35 U.S.C. 103(a) as being unpatentable over Kashiwazaki et al in view of Lawrence et al and Thompson et al and further in view of Kurabayashi et al is respectfully requested.

Claims 10 and 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kashiwazaki et al (U.S. 5,640,187) in view of Lawrence et al (U.S. 6,280,027) and Thompson et al (U.S. 6,341,856).

The foregoing rejection, which is listed as paragraph 12 on page 12 of the Office Action, appears to be a duplicate of paragraph 10 on page 9 of the Office Action, in that the same claims are rejected over the same three references. In the above-referenced telephone discussion with the Examiner on June 25, 2002, the Examiner stated that the argument in paragraph 12 is slightly different than that of paragraph 10.

The foregoing distinction notwithstanding, Applicants submit that the comments made above in connection with the earlier ground of rejection obtain here as well, including the Rule 132 Declaration.

Reconsideration of the rejection of Claims 10 and 14-15, as amended, under 35 U.S.C. 103(a) as being unpatentable over Kashiwazaki et al in view of Lawrence et al and Thompson et al is respectfully requested.

Claims 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kashiwazaki et al in view of Lawrence et al and Thompson et al as applied to claims 10 and 14-15 above, and further in view of Kurabayashi et al. (U.S. 5,985,975).

The foregoing rejection, which is listed as paragraph 13 on page 14 of the Office Action, appears to be a duplicate of paragraph 11 on page 11 of the Office Action, in that the same claims are rejected over the same four references. In the above-referenced telephone

discussion with the Examiner on June 25, 2002, the Examiner stated that the argument in paragraph 12 is slightly different than that of paragraph 10.

The foregoing distinction notwithstanding, Applicants submit that the comments made above in connection with the earlier ground of rejection obtain here as well, including the Rule 132 Declaration.

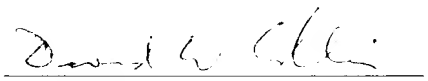
Reconsideration of the rejection of Claims 11-13 under 35 U.S.C. 103(a) as being unpatentable over Kashiwazaki et al in view of Lawrence et al and Thompson et al and further in view of Kurabayashi et al is respectfully requested.

The Examiner cites the following reference as being pertinent to Applicants' disclosure: Ono et al. (U.S. 6,238,045). Applicants have reviewed this reference and consider that it neither discloses nor suggests their invention as claimed, whether taken alone or in any reasonable combination with the above-discussed references.

The foregoing amendments and arguments, together with the Rule 132 Declaration, are submitted to place the application in condition for allowance. The Examiner is respectfully requested to take such action. If the Examiner has any questions, she is invited to contact the undersigned at the below-listed telephone number. HOWEVER, ALL WRITTEN COMMUNICATIONS SHOULD CONTINUE TO BE DIRECTED TO: IP ADMINISTRATION, LEGAL DEPARTMENT, M/S 35, HEWLETT-PACKARD COMPANY, P.O. BOX 272400, FORT COLLINS, CO 80527-2400.

Respectfully submitted,

June 26, 2002



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

The paragraph beginning on line 21 of page 8 has been amended as follows:

The polymers are polymerized monomers selected from the group consisting of:

The paragraph beginning on line 8 of page 9 has been amended as follows:

5. Polyethylene [glycols and] glycol esters of acrylic and methacrylic acid:

The paragraph beginning on line 12 of page 9 has been amended as follows:

6. Polyalkylene [glycols and] glycol esters of acrylic and methacrylic acid:

The paragraph beginning on line 15 of page 9 has been amended as follows:

7. Sulfoalkyl(aryl) acrylate and methacrylate esters, and salts thereof:

The paragraph beginning on line 25 of page 21 has been amended as follows:

In a two-part system, the fixer solution of the present invention comprises (1) a reactive monomer or oligomer in a vehicle, the reactive monomer or oligomer selected from the group consisting of iso-cyanates and epoxy-terminated oligomers, and (2) at least one second component selected from the group consisting of polyols[,] and polyvinyl alcohols[, and] plus a base [catalysts] catalyst. The reactive monomer or oligomer is contained in a separate cartridge from the ink-jet ink print cartridge(s), while the second component(s) is contained in at least one ink-jet ink print cartridge. The reactive monomer or oligomer reacts with the second component(s) on the print medium to form a polymer, which has a glass transition temperature within a range of -50° to +100°C and a melting temperature within a range of 30° to 150°C. The vehicle may comprise water alone or water in combination with one or more water-soluble organic solvents, listed above.

IN THE CLAIMS:

Claims 1, 5, 6, and 10 have been amended as follows:

1. (Amended) A fixative for ink-jet printing, said fixative for underprinting or overcoating, or both, at least [one ink] three color inks printed on a print medium, each said ink printed from a separate print cartridge, said fixative comprising a one-part system and [comprising] consisting essentially of a polymer in a vehicle, said polymer selected from the group consisting of vinyl-based polymers, condensation polymers, and copolymers thereof, said polymer having a glass transition temperature within a range of -50° to +100°C, a melting temperature within a range of 30° to 150°C, and a molecular weight (weight average basis) within a range of 3,000 to 100,000, said fixative contained in a separate cartridge from said [at least one ink-jet] ink print [cartridge] cartridges.

5. (Amended) The fixative of Claim 1 wherein said polymer is a polymerized monomer or said copolymer is at least two copolymerized monomers, said monomer selected from the group consisting of (a) acrylic and methacrylic acids and salts thereof, (b) esters of acrylic and methacrylic acids, (c) amides of acrylic and methacrylic acids, (d) hydroxy amides of acrylic and methacrylic acids, (e) polyethylene [glycols and] glycol esters of acrylic and methacrylic acid, (f) polyalkylene [glycols and] glycol esters of acrylic and methacrylic acid, (g) sulfoalkyl(aryl) acrylate and methacrylate esters, and salts thereof, (h) polyalkylene (aryl) glycol diacrylates and dimethacrylates (i) triacrylates, trimethacrylates, tetraacrylates, and tetramethacrylates (j) styrene and [its derivatives] substituted styrene, (k) vinyl esters and alcohols, (l) vinyl ethers, (m) diallyldialkyl ammonium halides, (n) vinyl sulfonic acid and salts thereof, (o) N-vinylamides, (p) polyunsaturated betaines, (q) polyunsaturated sulfo-betaines, (r) polyunsaturated amine oxides, (s) polyunsaturated fatty acids, (t) polyethylene oxide alkyl alkyenyl phenols, (u) polyalkylene and polyaryl glycol diacarylates and dimethacrylates, (v) polyalkylene and polyaryl divinyl ethers, (w) trimethylolpropane triacrylates and trimethacrylates, (x) alkoxylated trimethylolpropane triacrylates and trimethacrylates, (y) glycerol triacrylates and trimethacrylates, (z) alkoxylated glycerol triacrylates and trimethacrylates, (aa) pentaerythritol tetraacrylates and tetramethacrylates, and (ab) alkoxylated pentaerythritol tetraacrylates and tetramethacrylates.

6. (Amended) The fixative of Claim [5] 1 wherein said polymer is a polymerized monomer or said copolymer is at least two copolymerized monomers, said monomer selected

from the group consisting of allyl methacrylate, allyl acrylamide, N-vinyl carbazole, N-vinyl pyrrolidone, vinyl imidazole, vinyl pyridine, 1,4-diisocyanatobenzene, toluene diisocyanate, 4,4'-methylenebis(phenyl isocyanate), polymethylene poly(phenyl isocyanate), dicyclohexylmethane diisocyanate, and 1,4-cyclohexane diisocyanate.

10. (Amended) A fixative for ink-jet printing, said fixative for underprinting or overcoating, or both, at least one ink printed on a print medium, each said ink printed from a separate print cartridge, said fixative comprising a two-part system and [comprising] consisting essentially of (1) a reactive monomer or oligomer in a vehicle, said reactive monomer or oligomer selected from the group consisting of iso-cyanates and epoxy-terminated oligomers and (2) at least one second component selected from the group consisting of polyols[,] and polyvinyl alcohols[, and] plus a base [catalysts] catalyst, said reactive monomer or oligomer contained in a separate cartridge from said at least one ink-jet ink print cartridge and said at least one second component contained in said at least one ink-jet ink print cartridge, said reactive monomer or oligomer reacting with said at least one second component on said print medium to form a polymer, said polymer having a glass transition temperature within a range of -50°C to +100°C and a melting temperature within a range of 30°C to 150°C.

Claim 2 has been cancelled.

IN THE ABSTRACT:

The Abstract has been amended as follows:

One-part and two-part fixatives are provided in conjunction with underprinting or overcoating at least one ink printed on a print medium. The one-part fixative [of the present invention] comprises a polymer in a vehicle. The polymer is selected from the group consisting of vinyl-based polymers, condensation polymers, and copolymers thereof and [the polymer] has a glass transition temperature within a range of -50°C to +100°C, a melting temperature within a range of 30°C to 150°C, and a molecular weight (weight average basis) within a range of 3,000 to 100,000. [The fixative is contained in a separate cartridge from the ink-jet ink print cartridge(s).] The two-part fixative [of the present invention] comprises (1) a reactive monomer or oligomer in a vehicle, the reactive monomer or oligomer selected from the group consisting of

iso-cyanates and epoxy-terminated oligomers, and (2) at least one second component selected from the group consisting of polyols, polyvinyl alcohols, and base catalysts. [The reactive monomer or oligomer is contained in a separate cartridge from the ink-jet ink print cartridge(s), while the second component(s) is contained in at least one ink-jet ink print cartridge. The reactive monomer or oligomer reacts with the second component(s) on the print medium to form a polymer, which has a glass transition temperature within a range of -20°C to +50°C and a melting temperature within a range of 30°C to 100°C.] Enhancement of waterfastness, smearfastness, smudgefastness, and lightfastness is provided by use of the fixative solution [of the present invention].

ABSTRACT OF THE DISCLOSURE

One-part and two-part fixatives are provided in conjunction with underprinting or overcoating at least one ink printed on a print medium. The one-part fixative comprises a polymer in a vehicle. The polymer is selected from the group consisting of vinyl-based polymers, condensation polymers, and copolymers thereof and has a glass transition temperature within a range of -50°C to +100°C, a melting temperature within a range of 30°C to 150°C, and a molecular weight (weight average basis) within a range of 3,000 to 100,000. The two-part fixative comprises (1) a reactive monomer or oligomer in a vehicle, the reactive monomer or oligomer selected from the group consisting of iso-cyanates and epoxy-terminated oligomers, and (2) at least one second component selected from the group consisting of polyols, polyvinyl alcohols, and base catalysts. Enhancement of waterfastness, smearfastness, smudgefastness, and lightfastness is provided by use of the fixative solution.